INTERIM REMEDIAL ACTION WORK PLAN PASSIVE VENT WELL INSTALLATION

Building 637 North LUST Site Tooele Army Depot,

TOOELE, UTAH

Draft Final Submittal

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ACRONYMS

bgs	Below Ground Surface
BRAC	Base Realignment and Closure
BTEXN	Benzene, Toluene, Ethylbenzene, total Xylenes, and Naphthalene
DERR	Division of Environmental Response and Remediation
DSHW	Division of Solid and Hazardous Waste
ID	Inside Diameter
IDW	Investigation Derived Waste
LUST	Leaking Underground Storage Tank
PVC	Polyvinyl Chloride
RCRA	Resource Conservation and Recovery Act
SCA	SCA Environmental, Inc.
SSHP	Site Safety and Health Plan
SVE	Soil Vapor Extraction
TEAD	Tooele Army Depot
UAC	Utah Administrative Code
UID	Utah Industrial Depot
UDEQ	Utah Department of Environmental Quality
USACE	United States Army Corps of Engineers
UST	Underground Storage Tank

WORK PLAN
PASSIVE VENT WELL
BUILDING 637N LUST SITE
TOOELE ARMY DEPOT

1.0 INTRODUCTION

1.1 Scope of Work

This Work Plan presents the project scope, regulatory authorities, site background, and project objectives for installation of a Passive Vent Well at the Building 637 North Leaking Underground Storage Tank (LUST) Site (637N) at Tooele Army Depot (TEAD), Tooele, Utah. This passive vent well is intended as an interim remedial measure, and not as a corrective active for site closure.

The United States Army Corps of Engineers (USACE), Sacramento District prepared this Work Plan for TEAD. The 637N LUST site is being managed by the State of Utah Department of Environmental Quality (UDEQ) Department of Environmental Response and remediation (DERR), and has been assigned Facility #8000047.

1.2 Site Description

TEAD is located in Tooele Valley, Utah, approximately 35 miles southwest of Salt Lake City and immediately west of the city of Tooele (Figure 1). The installation covers 23,610 acres. Building 637 is located within the former Industrial Area of TEAD. It is a part of the Base Realignment and Closure (BRAC) parcel, an area that has been designated for future commercial/industrial use, and has been transferred to a group called the Utah Industrial Depot (UID). The 637N site is located at the northwest corner of Building 637 (Figure 2). The ground surface consists of grass-, gravel-, and asphalt-covered areas, and underground and aboveground utilities are located throughout the site vicinity. Groundwater beneath this area of TEAD is estimated to be 350 feet below ground surface (bgs) (Kleinfelder, Inc., and USACE, 1996).

Building 637 was formerly used for vehicle engine and transmission repair, rebuilding and testing. Two groups of engine test cells, which are present along the east and south walls of the building, were supplied with fuel (gasoline and/or diesel) from underground storage tanks (USTs) located around the outside of the building. Waste oil from an oil water separator located inside the building was transported to a waste oil UST near the northwest corner

(Figure 3). This UST was removed in 1994, and subsequent investigations showed that the tank had leaked, resulting in petroleum hydrocarbon contamination of site soil.

1.3 Objectives

The Utah DERR requires the owner/operator of a UST facility to report, control, abate, and characterize releases from a UST by assessing the extent and degree of impact to the environment and to conduct remediation, if warranted. Environmental impact has been documented and characterized at 637N, site remedial action has already been attempted via a soil vapor extraction (SVE)/bioventing-air injection system, and, it has been determined that there is no significant current risk to the environment or on-site workers (SCA, 2004). But it has been concluded that if a new building were to be constructed above the location of the highest detected concentration of benzene at 637N, indoor workers could potentially be at risk from vapor intrusion into indoor air (USACE, 2004). Therefore, the objective of this plan is to justify and describe the interim remedial measure (enhanced natural attenuation with passive venting) that has been chosen to lessen the risk of possible future exposure to on-site workers. Following a 5-year operation time, confirmation sampling will occur and site closure will be requested.

1.4 Site Remedial History and Subsurface Investigation Results

Since the UST removal in 1994, numerous subsurface investigations have occurred at 637N, for the purpose of assessing the vertical and lateral extent of impacts to soil and groundwater associated with release of petroleum hydrocarbons from the UST at this site. The document “Final Confirmation Sampling and Tier 2 Report” (SCA, 2004) details the history of environmental investigations and remediation at 637N. Groundwater beneath this area of TEAD is estimated to be 350 feet bgs, and due to site geology and depth to groundwater, it is considered unlikely that impacts from 637N have affected groundwater.

Due to petroleum hydrocarbon impacts to site soil, site remediation has been previously attempted at 637N. From 1999 to 2001, SVE/bioventing-air injection were conducted (10 months of SVE/bioventing operation, followed by 15 months of air injection operation). Following this remedial action, confirmation sampling in 2001 and 2003 indicated that Tier1 screening levels were exceeded for several petroleum hydrocarbons, and a Tier 2 risk assessment was performed. Due to the site geology, depth of contamination, and types of contaminants, benzene was deemed to be the only potential contaminant of concern for Tier 2 site closure. The January 2003 sampling resulted in benzene detection in Soil Boring 637-1-012303 (Figure 3), at a depth of 15 feet below ground surface (bgs) (7.5 mg/kg, exceeding the Tier I Screening Level: 0.9 mg/kg). While not a current risk, this detection was deemed a potential risk to future indoor industrial workers due to its proximity to the ground surface (SCA, 2004).

2.0 CORRECTIVE ACTION COMPARISON SELECTION

2.1 Extent of Impacted Soil and Groundwater Requiring Treatment

2.1.1 Soil

No detailed analysis of the extent and volume of impacted soil that requires treatment has occurred. Benzene contamination of 7.5 mg/kg, exists at 15 feet bgs. All other site soil contamination has been remediated or is unlikely to result in human exposure, due to site geology and the depths and concentrations of the contaminants (SCA, 2004).

2.1.2 Groundwater

Groundwater beneath 637N is estimated to be 350 feet bgs, and due to site geology and depth to groundwater, it is considered unlikely that impacts from 637N have affected groundwater (SCA, 2004).

2.2 Treatability of Contaminants of Concern

The contaminant of concern at 637N is benzene. Benzene is volatile, mobile, and biodegradable.

2.3 Selection of Potential Remediation Alternatives

Alternatives taken into consideration were based on based on available site analytical data, site geology and hydrogeology, and the distribution, concentration, and physical-chemical properties on benzene, the contaminant of concern. Excavation and disposal was not considered, due to the high cost involved in using that technique at this site (due to site conditions, depth of contamination, and expected volume of contaminated soil). Also, SVE, bioventing, air injection, and specialized technologies such as in-situ vitrification, were not considered due to prohibitive cost.

2.3.1 Soil Treatment Options

1) No Further Action – This option involves foregoing active remediation at the site, with the assumption that present soil concentrations are not a threat to human health or the environment. This option is considered when concentrations are below accepted regulatory concentrations and may involve site monitoring for an extended period to verify that contaminant migration is not impacting.

2) Natural Attenuation – This option involves foregoing active remediation of the site with the assumption that present concentrations, although above regulatory criteria, are expected to naturally attenuate to an acceptable leveling a reasonable time period. This option typically involves long-term monitoring of soil vapor

concentrations and soil concentrations to confirm contaminant reduction with time. The primary contaminant reduction process is biodegradation.

2.4 Selected Remedial Alternative

In a corrective action analysis, alternatives are generally screened using four criteria: 1) feasibility, 2) effectiveness, 3) cost, and 4) time to complete. Feasibility includes the alternative's ability to be implemented, based on technical restraints of the required equipment, the environmental conditions, and the acceptability to regulatory agencies and the public. Effectiveness includes the alternative's ability to achieve the cleanup goals while protecting the human health and the environment during and after the remediation activities. Since detailed cost estimates are not prepared for the screening evaluation, costs are used as a screening criterion when the roughly estimated cost of an alternative is clearly higher (approximately 50% more) than the other viable alternatives. Time to complete was not used as a screening criterion as contamination is not likely to reach groundwater and there is currently a low risk to human health and the environment associated with this site.

Given the results of the site investigations (i.e., a benzene result exceeding the Tier 1 screening level, and a possible risk to future indoor workers), no further action at the site is not a feasible option for the soil. Therefore, this option will not be considered further, and the only remaining viable option is enhanced natural attenuation with passive venting. Passive venting was added to enhance natural attenuation as it is a proven technology that can cost-effectively be implemented.

2.5 Evaluation of Enhanced Natural Attenuation with Passive Venting

There are six generalized criteria for evaluating remedial alternatives: technical effectiveness, implementability, cost effectiveness, historical success, environmental acceptability, and reliability. Enhanced natural attenuation with passive venting was evaluated for each criterion and was judged poor, fair, very good, or excellent as shown in the evaluation summary on Table 1. This methodology was not rigorously applied, but rather conceptually administered based on the technology, available information on the site and contaminant distribution, and previous experience with similar sites. The evaluation criteria are defined as follows:

- Technical effectiveness is generalized as the degree to which the selected remediation technology can be expected to achieve cleanup goals and facilitate site closure in a reasonable time period.
- Implementability is the difficulty or ease with which the technology can be physically applied at the selected site. This criterion considers the degree of disturbance to the are, the affect on the future land use, the difficulty or complexity of construction, the level of effort for operation and

maintenance, and the difficulty of system decommission and/or well abandonment.

- Cost Effectiveness is the relative comparison cost of implementation, construction, and operation relative to each potential alternative. Though primarily relative, this criterion also considers the cost of each alternative based on an experience-based sense for how much it should cost to remediate the site based on knowledge of site-related conditions.
- Historic success defines the level of historical information available indicating the effectiveness of the alternative as evidenced by field data at similar sites.
- Environmental acceptability is the degree to which the alternative would be protective to human health and the environment if implemented.
- Reliability defines how well the alternative can be expected to consistently and properly operate to design specifications throughout the proposed operation duration. This criterion is often a measure of the complexity of the application (more complex systems tend to have more down time).

The cost presented in Table 1 is a rough estimate based on incomplete information. The enhanced natural attenuation with passive venting alternative assumes five years to achieve cleanup of the site.

3.0 PASSIVE VENTING DESIGN AND CONSTRUCTION

3.1 Design Assumptions

Information available for remedial design consists of data from the initial UST closure, as well as subsurface investigations conducted from 1995 to 2003.

3.2 Passive Venting Design and Well Installation

Vent well installation shall reference the existing Corrective Action Plan (Kleinfelder, 2003) for vent well 7DA at TEAD Building 7, and be adapted as needed. The vent well shall be constructed of 4-inch inside diameter (ID) Schedule 40 PVC casing. The borehole shall extend to approximately 21 feet bgs, using hollow-stem auger drilling, and the well shall be screened between 10 and 20 feet bgs, with a 0.02-inch slotted screen. The sand filter pack shall extend 3 feet above the screened interval. The annulus of the upper 7 ft shall be plugged with hydrated bentonite chips. The well riser shall extend two feet above the ground surface, and shall be protected by four 4-inch bollards (steel, concrete-filled). The well will be left open with a turbine ventilator on top of the well allowing direct venting to the atmosphere. The well shall be located as close possible to the location of previous soil boring 637-1-012303 (Figure 3) (approximate location (NAD 83): Northing: 7361946, Easting: 1405998).

Passive venting will allow exchange of soil vapor and atmospheric air during diurinal fluctuations in barometric pressure due to changes in weather. The changes in barometric pressure in the atmosphere are mirrored by changes in barometric pressure in the subsurface. However, the response in the subsurface is delayed, creating pressure differentials that force the venting well to inhale and exhale. Passive venting has been successfully demonstrated at Hill Air Force Base (Downs, 2001).

Prior to any invasive fieldwork, utilities will be located using UID/TEAD and Blue Stakes protocols. A field geologist shall provide a detailed record of all drilling activities and maintain a log of subsurface conditions.

Investigation derived waste (IDW) generated during the drilling activities will be properly stored on site while the drilling proceeds. The container will be labeled with non-hazardous petroleum-impacted soil labels. It is assumed that the IDW will not contain hazardous compounds. If hazardous compounds are detected in the IDW, the disposal method and costs will be reevaluated. Once the disposition of the IDW has been determined, the Contractor shall meet with the TEAD Environmental Office to facilitate the disposal.

3.3 <u>Pre-Construction Documents</u>

The Contractor shall prepare a Site Safety and Health Plan (SSHP). The SSHP shall describe the safety and health procedures, practices, and equipment to be implemented and utilized in order to protect affected personnel from the potential hazards associated with the site-specific tasks to be performed (as required by EM 385-1-1 and ER 385-1-92; as well as OSHA requirements (29 CFR 1926.65 / 29 CFR 1910.120)). Additionally, the Contractor shall be required to prepare an Environmental Protection Plan prior to field activities. This plan shall include spill prevention, decontamination procedures, IDW handling procedures, etc. All fieldwork will be performed in accordance with the SSHP. The SSHP must be reviewed and approved by the USACE prior to any field activities.

3.4 <u>Passive Vent Well Installation Report</u>

Following completion of field activities, the Contractor shall submit a report detailing work performed. At a minimum, the report should contain

- A summary of all work completed including any deviations from the Work Plan;
- Detailed maps of the remedial sites showing the surveyed location of the vent well;
- Descriptions of any problems encountered during the progress of the work and actions taken to resolve the problems;

- Attachments containing a complete photo log of the work accomplished;
- Copies of boring logs, daily field logs and daily reports as documentation of field activities;
- Field log books are required to contain at a minimum the information contained in section 1.5.1.1 of the TEAD CDQMP and must follow the procedures for field activity documentation presented in TEAD CDQMP SOP 1.2;
- All manifests prepared for disposal of investigation derived waste; and
- All analytical results.

4.0 PERMITTING ISSUES

Throughout the active operation of the SVE/bioventing-air injection system at VW-1 at 637N, cumulative emissions were within *de minimus* limits (SCA, 2004). Therefore, it is assumed that the operation of the newly-installed passive vent well will be in accordance with Utah Administrative Code (UAC) R-307-413-2 for *de minimus* emissions from soil ventilation projects. The Utah Division of Air Quality will require a Notice of Intent prior to the start of passive venting.

5.0 PUBLIC NOTIFICATION

The Utah DERR requires notification of the potentially affected public before implementing a corrective action. The population affected by the proposed corrective action is limited due to access restrictions on TEAD. Public notice will describe the remedial action that will occur at the site. The public notice will be published in the Deseret Star and Tooele Transcript newspapers. The proposed notice follows:

PUBLIC NOTICE

Corrective Action: ***Facility Identification No. 8000047, Release Site EIPL.*** The Tooele Army Depot (TEAD), Utah will be remediating an underground storage tank release immediately north of Building 637, TEAD, Utah. Elevated concentrations of petroleum hydrocarbons were detected in soils in this area during subsurface investigations conducted in 2003. The petroleum hydrocarbons will be remediated by enhanced natural attenuation using passive venting. The Work Plan, which describes site contaminants and the proposed remediation method, may be reviewed at the Utah Department of Environmental Quality, 168 North 1950 West, Salt Lake City, Utah. For additional information, contact Bill Ienatsch at the TEAD Environmental office (435-833-2761), or Hillary Mason at the Utah Division of Environmental Response and Remediation (801-536-4100).

6.0 SAMPLING AND MONITORING

No sampling and monitoring is required during the 5-year time frame of enhanced natural attenuation with passive venting. It is assumed that the enhanced natural attenuation with passive venting will achieve the recommended cleanup levels (0.9 mg/kg benzene) in five years. At that time, confirmation soil samples will be collected from the site. The scope of this program would include advancing one 15-foot boring as close as possible to the venting well to obtain soil samples for analysis of benzene. That future sampling effort will provide evidence required for site closure. (At the 5-year sampling event, all soil samples will be submitted for analysis of benzene, toluene, ethylbenzene, total xylenes, and naphthalene (BTEXN) by method 8260B. Additionally, one composite soil sample will be collected from the IDW for analysis of D-List metals by method 6010B to facilitate disposal. The details of the 5-year sampling event will be proposed in a Work Plan, after 5 years of enhanced natural attenuation with passive venting has occurred.

7.0 REFERENCES

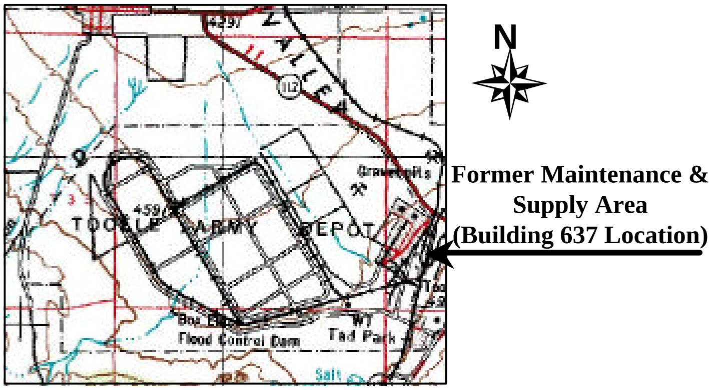
1. Kleinfelder, Inc., and U.S. Army Corps of Engineers, 1996, Project Work Plans, Additional Subsurface Characterization, Building 637-N, 637-SW, 637-SE and 691 LUST Sites, Tooele Army Dept (TEAD), Tooele, Utah, December 1996.
2. SCA Environmental, Inc., and Kleinfelder, Inc., 2000, Final Work Plan, Building 637 North LUST Site, Tooele Army Depot, Tooele, Utah, February 1999.
3. SCA Environmental, Inc., and Kleinfelder, Inc., 2000, Operating Report No.6, Building 637 SVE System, Tooele Army Depot, Tooele, Utah, May 2000.
4. Downs, Wayne 2001, 1998-2000 Passive Soil Vapor Extraction at Operable Unit 6, Hill Air Force Base, Utah, 2001.
5. RCRA Post-Closure Permit (February 12, 2001) issued to TEAD by the State of Utah Department of Environmental Quality (UDEQ), Division of Solid and Hazardous Waste (DSHW).
6. Kleinfelder, Inc., 2003, Final Corrective Action Plan, Building 7, Tooele Army Depot, Tooele, Utah, July 2003.
7. SCA Environmental, Inc., 2004, Final Confirmation Soil Sampling and Tier 2 Report, Building 637 North LUST Site, Tooele Army Depot, Tooele, Utah, March 2004.
8. U.S. Army Corps of Engineers, 1996, Project Work Plans, Additional Subsurface Characterization, Building 637-N, 637-SW, 637-SE and 691 LUST Sites, Tooele Army Dept (TEAD), Tooele, Utah, September 2004.
9. U.S. Army Corps of Engineers, 2003, Engineer Manual EM 385-1-1, Safety and Health Requirements Manual, November 2003.

Table 1

Remedial Alternative Evaluation Summary

Assessment Criterion	Enhanced Natural Attenuation with Passive Venting
Technical Effectiveness	Fair
Implementability	Good
Cost Effectiveness Capital Cost Sampling Cost O&M Cost Total Estimate Cost	Good $10,000 $10,000 -- $20,000
Historical Success	Good
Environmental Acceptability	Good
Reliability	Good
Estimated Time to Closure	5 years

Figures



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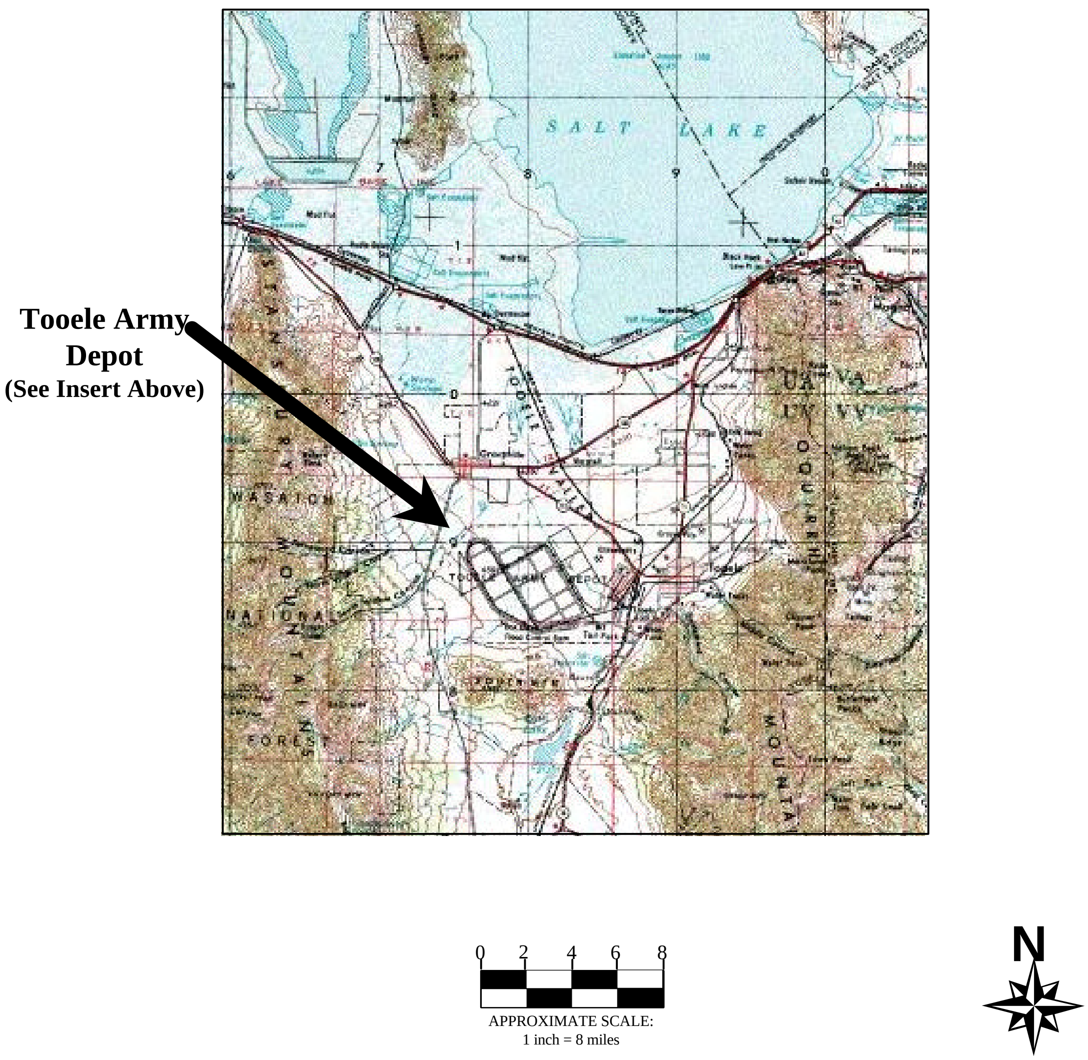
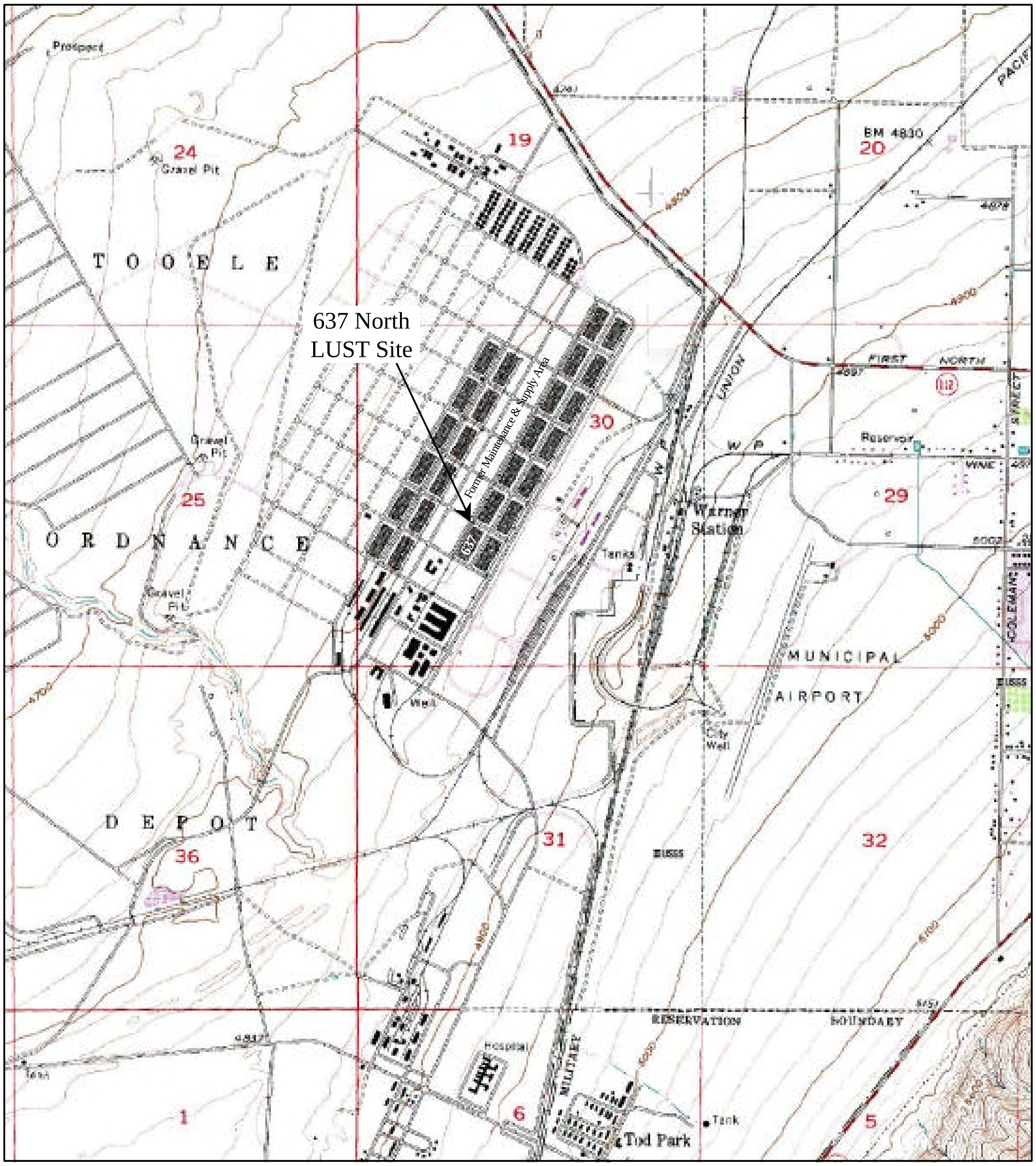


	Adapted from Final Confirmation Soil Sampling and Tier 2 Report, Building 637 North LUST Site, Tooele Army Depot, Tooele, Utah Authored by SCA Environmental, Inc., 2004	SITE LOCATION MAP OF 637 NORTH LUST SITE TOOELE ARMY DEPOT TOOELE, UTAH	FIGURE 1

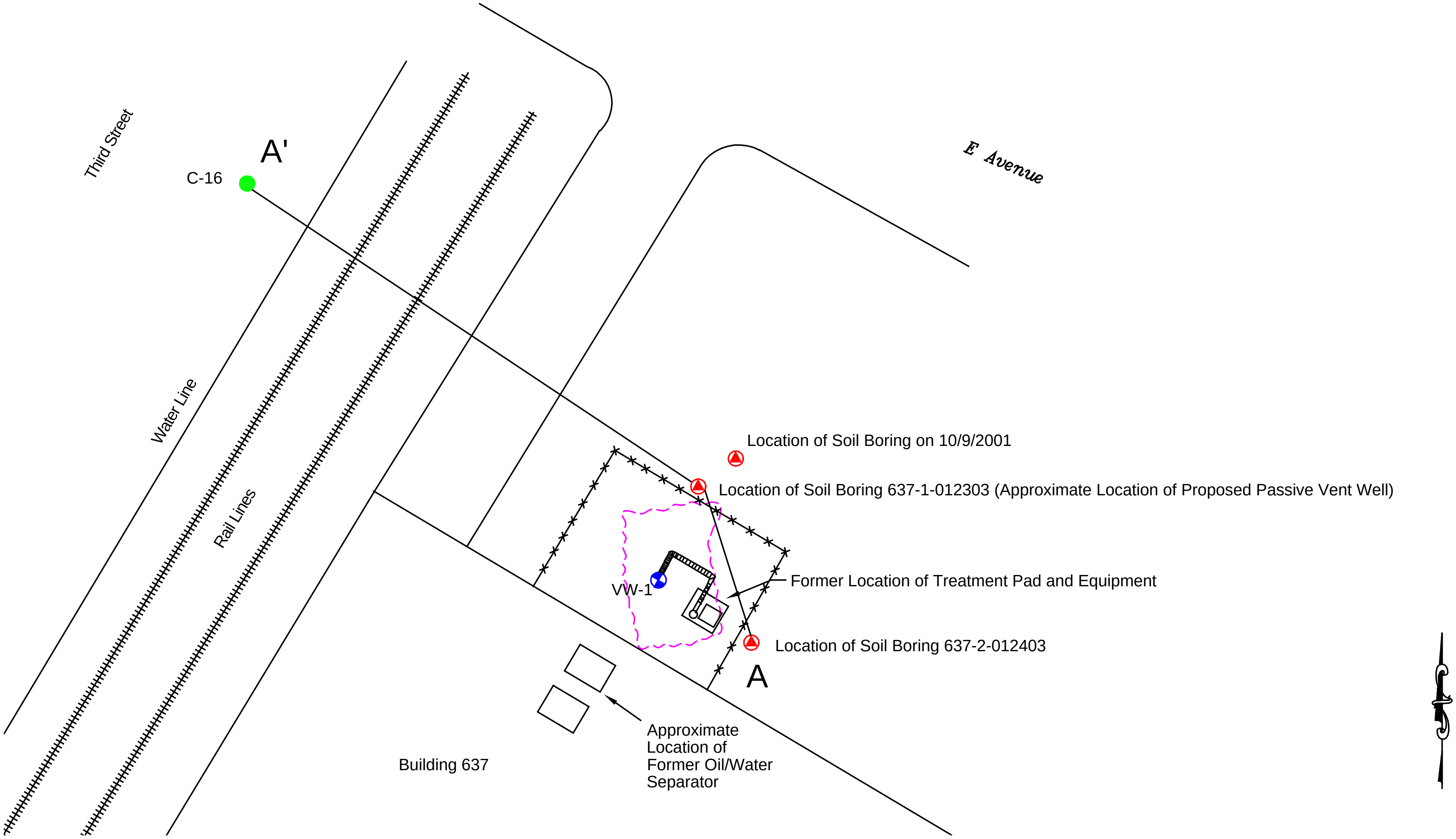


0 0.125 0.25

APPROXIMATE SCALE:
1 inch = 0.25 miles (or 1,320 feet)

N

Adapted from Final Confirmation Soil Sampling and Tier 2 Report, Bldg 637 North LUST Site, Tooele Army Depot, Tooele, Utah Authored by SCA Environmental, Inc., 2004	SITE PLAN FOR 637 NORTH LUST SITE TOOELE ARMY DEPOT TOOELE, UTAH	FIGURE 2



LEGEND

- Soil Boring Location Completed as Vent Wall
- Soil Boring Location Completed as Monitoring Well
- Confirmation Boring Location
- Approximate Excavation Boundary
- Fence

0 20 30 40

SCALE: 1 inch = 20

		BUILDING 637 NORTH LUST SITE TOOELE ARMY DEPOT (Proposed Passive Vent Well Location) Adapted from SCA Environmental Inc. - Final Confirmation Soil Sampling Report- B 637N, 2004	FIGURE 3